MorphoX

upgrade your mod wheel to a morph wheel

user manual

MorphoX

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Thanks to all beta testers

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Welcome

Thank you for purchasing the LinPlug MorphoX.

The LinPlug MorphoX is a morphing synthesizer designed for creating music on your personal computer.

The LinPlug MorphoX's key features is the ability to morph between two sounds. It comes with a set of high quality presets in a wide range of styles, an easy-to-use interface and a highly flexible sound engine including many processing and modulation options and a powerful, flexible arpeggiator.

This manual describes all aspects of the LinPlug MorphoX synthesizer and is designed so that your use of this software is as efficient and as pleasurable as possible.

We feel that the LinPlug MorphoX is exceptional because of its audio quality and its features, especially because of it real time morphing ability. We are confident that you will get a lot of pleasure using the LinPlug MorphoX synthesizer and that it will become an inspirational part of your music-making.

the LinPlug team, September 2010

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Installation

Installation on Mac

After downloading the LinPlug MorphoX for Mac you will find a file named "MorphoX Installer xxx.dmg" located in your download folder. The xxx Is the actual version number, in example 100.
Double-click this file to decompress and open the image, then double-click the installer program which will guide you through the installation process. The instrument file "MorphoX" and the factory presets will now be placed in the right directory for virtual instruments on your Mac.
The next time you start your host software the LinPlug MorphoX will be listed in the AU / RTAS / VST Instrument list.

Installation on PC

After downloading the LinPlug MorphoX for PC you will find a file named "MorphoX Installer xxx.exe" located in your download folder. The xxx Is the actual version number, in example 100.
Start this program and the Installer will guide you through the installation process. Make sure you choose the right directory, so your host software finds the MorphoX. Refer to your host software's manual if you are unsure about where the host software plug-in directory is located.

The instrument file "MorphoX.dll" and the factory presets will be placed in the chosen directory. The next time you start your host software the LinPlug MorphoX will be listed in the VST Instrument list.

Common to Mac and PC

After you've installed and opened the LinPlug MorphoX, for the first time you will see a “S/N” edit box on the Settings page, which should read "Enter here" in red letters.
Enter the serial number you have received into this edit box. If the serial number has not been entered or it has been entered incorrectly, the LinPlug MorphoX will remain in demo mode. **To switch back to the main edit screen click the LinPlug MorphoX logo on the rear panel or the Edit button located bottom right.**

If you have any questions regarding the installation of LinPlug MorphoX please contact our support team at
http://www.linplug.com/support/support.htm.

Features

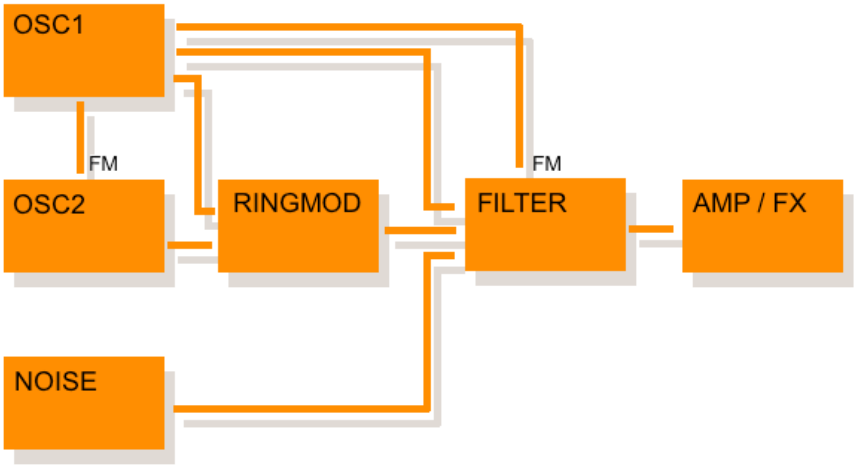
The LinPlug MorphoX combines a number of features which LinPlug is famous for with some new, exciting features:

- The sound can be continuously morphed between two individual sounds in real time using the modulation wheel.
- Two versatile oscillators with many modulation capabilities plus noise oscillator.
- Oscillator cross modulation (FM, AM, Ringmod), cross modulation intensity itself can also be modulated
- Individual spread (multiple voices) and saturation for both oscillators
- Stereo Filter with simultaneous low pass, band pass and high pass
- Filter FM, intensity itself can also be modulated
- Three ADSR envelopes for filter, amplitude and general modulation, the envelope times can be modulated
- Two LFOs with various waveforms, delay, attack and tempo-sync, LFO tempo can be modulated
- Modulation Matrix which includes 10 routings with more than 20 sources and more than 40 destinations.
- Adjustable Precision for recreating the warmth of analog synthesizers.
- Mono- and polyphonic Portamento/Glide, morphing
- Chorus and Stereo Delay effect units, fully morphing
- 2 sound layers, each containing all above mentioned features
- Arpeggiator with 16 step rhythm sequencer, step length, clock settings, various modes including modulation and chord, switchable re-trigger, save/load/copy/paste functionality
- Two global LFOs, one with special, adjustable “stair” waveform
- Morph Section, allowing setting the morph range and the morph curve for fine adjusting the morphing
- Sound programs are stored directly on hard disk. Sounds are sorted into style-maps for easy search. Integrated Sound Browser, MIDI program change supported.
- Microtonal support (Scala file import) for different scales (Indian, Arabic, etc.)
- 32-voice polyphony, adjustable voice limit (mono, 1...12, 32).
- MIDI Learn, settings can be saved / restored.

Overview

The LinPlug MorphoX is a 32 note-polyphonic virtual subtractive-style synthesizer, combining various oscillators, a special filter module, many modulation and effects modules with its real time morphing capability.

The block diagram below shows the signal flow within the LinPlug MorphoX synthesizer:



The shadow behind each module indicates that there are two complete independent settings for all these modules, the sub-programs A and B (actually there are even more modules morphing, in example all the LFO's and Envelopes, but this is only audio signal flow).

Audio signals are generated by the oscillators who gets pitch information from the host software. MorphoX receives its MIDI data on all Channels simultaneously (Omni mode).

The LinPlug MorphoX has two oscillators plus a noise oscillator. Each oscillator's pitch, amplitude, panning and more can be controlled using the Modulation Matrix. Oscillator 2 is followed by a Ringmodulator which is also feed from Oscillator 1.

The output of all of the oscillators and Ringmodulator is routed to the Filter. The Filter modifies the frequency spectrum of the oscillator's output. The

filters works in stereo and has an envelope for controlling its cutoff parameter.

Oscillators one's output can be used to independently modulate the frequency of oscillators two and the filter cutoff. This option increases the richness of the spectrum of the modulated oscillator and filter, producing very interesting, harmonically-rich results.

The output of the Filter section is then sent to the Amp / FX (Effects) section which contains two successive stereo effects modules: a Chorus and a Delay. The output of the effects is send back to the host software's mixer.

At various points throughout the signal path you can modulate the signal using either envelopes, LFOs, the Arpeggiator or MIDI Controllers. The LinPlug MorphoX contains 3 independent envelopes: one for the filter cutoff frequency, one for the main amplitude and one general purpose envelope designed for use with the Modulation Matrix. All of these can control any available modulation destination via the Modulation Matrix.

The LinPlug MorphoX also contains 4 independent LFOs. Two LFOs allow morphing, including their delay/attack envelopes. The other two LFOs are not morphing but have other special features. LFOs can be routed to any available modulation destination.

The Arpeggiator finally allows to create a vast variety of user-defined arpeggios. Arpeggios are chords that are played as separate successive notes or "broken chords". With the MorphoX's Arpeggiator you can control the way the Arpeggio is played in many, unusual ways including some wicked modulations.

More detailed information can be found in the following chapters.

Operation / Controls

Users have the option of controlling all LinPlug MorphoX dials in either a circular or a linear manner depending on the Dial Mode setting on the LinPlug MorphoX's rear panel (see the Settings chapter of this manual for more information about the MorphoX's rear panel).

Holding down the ALT key while clicking on a control changes the selected control's value a minimum step upwards (when clicking in the upper half of the control) or a minimum step downwards (when clicking in the lower half of the control).

Holding down the CTRL key (Windows) or COMMAND key (Mac) while clicking on a control sets the control to its default value (e.g. for Volume controls it sets the control's value to 0 dB).

Holding down the SHIFT key while changing a control's value enables finer control values to be set.

Double clicking once in a Modulation Matrix slot sets the value of the slot to 0.00. Double clicking in the same slot a second time resets the slot to its previous value.

All Controls can be controlled using external MIDI messages. To do this you need to use the LinPlug MorphoX's ECS which is described in detail later in this manual.

Morphing Area and Global Area

The upper part of the MorphoX user interface shows what we call the Morphing Area. That's the area holding all the controls to operate the modules which are morphing between the two sub-programs A and B. It's not required to technically understand the process of morphing, especially as it behaves differently for each module. The important thing is that it's not just a volume crossfading, which would be quite boring, but a process which gradually changes one sound to another, revealing some – often unexpected – intermediate sounds between the two sub-programs A and B.

You surely already came across a sound where moving the modulation wheel does open the filter, that's a very simple morphing process, having two synth sounds, one with filter closed and one with the filter more open. In MorphoX however, there is not changing just one property, but about 100 properties of a sound, from which some describe complex modulations (the ones from the modulation matrix).

While the complete basic synth engine and the chorus and delay effect can be morphed, there is also a Global Area. The Global Area, opposed to the Morphing Area above, does hold modules and controls for the whole instrument which does not depend on the modulation wheel and thus not morph.
All aspects of the Morphing Area and the Global Area are described in detail in the following chapters.

The reason for having a not-morphing (or global) area are as follows (in case you are interested, otherwise just skip this and continue with chapter Oscillators):

The arpeggiator cannot really morph between two settings because there is no way to musically morph from in example a 3 step pattern to a 5 step pattern. Moreover, even if the amount of steps would be the same there still could be “tied” notes in one pattern, but not in the other which forbids morphing.

The Stair Generator and the LFO 3 are host synced LFO's. Opposed to the morphing LFO's 1 and 2 (which are only tempo synced), the Stair Generator and LFO 3 are also position-synced, which means they don't depend on the triggering of a note but also run when no note is played, this is useful for certain rhythmic patterns. However, once position-synced you cannot morph them anymore.

Finally there are the morph-settings itself in the Global Area, preset management, ECS (MIDI learn) and the amount of voices (polyphony also cannot be musically morphed).

Oscillators

The LinPlug MorphoX contains 2 oscillators plus a noise source. The oscillators are similar, but not identical.

Common to both oscillators

The LinPlug MorphoX's oscillators' outputs a waveform that is a combination of two basic waveforms. These waveforms are constructed from harmonic sine waves using a unique additive process which ensures a smooth, high quality output signal.

The type of waveform is set by clicking on one of the Wave names below the Waveform Display. This opens a menu that allows you to select from the available waveforms. With the arrow keys next to the wave name you can switch through all available waveforms one by one (good for checking while playing). Left of the name you have the option to set various basic frequency, where 8” is as played and 4” and 2” is 1 and 2 octaves higher while 16” and 32” is 1 and 2 octaves lower as played.

The combined output waveform is shown in the Waveform Display.

The **Wave** dial allows you to interpolate between the two basic waveforms. When the dial is at its leftmost setting, the waveform consists of purely the first waveform. Similarly, if the dial is moved all the way to the right the waveform consists of purely the second waveform.
When in an intermediate position, the waveform is a mixture of the harmonics of the basic waveforms. It's probably easier to see this (in the display) rather than explain it, so try it for yourself: Set one wave to Sine (in the Dark category) and the other to Sawtooth. As you move the Wave dial from one end to the other you can see the wave changes between Sine and Sawtooth.

The **Symm** (symmetry) dial right next to the display changes the waveform symmetry. As the waveform display also shows the current symmetry setting, we suggest you just play with dial with having two clear basic waveform as Sine and Sawtooth to see how it affects he waveform. It's pretty straightforward.

The **F (free-run) button** – located on top, just right of the oscillators label - determines if the oscillator is re-triggered or not. When the Free-run button is Off, the phase of each note is reset at each onset. When the Free-run button is On, the phase of each note continues on from the phase of the previous note.

Both oscillators of the LinPlug MorphoX allow **Spread**, which means playing multiple detuned voices with one Oscillator without the loss of voices (full polyphony). The Spread slider is used to set the degree of

detuning among these voices. When moved from the bottom position the slider gradually detunes the voices to produce a thick and fat sound.

While oscillator one uses five voices and produces a more thick sound, oscillator two uses three voices and thus sounds different which might be better suited for certain sounds.

Oscillator 1

The **Phase** parameter does allow to specify at which point in the waveforms cycle the oscillator starts from. This parameter has no effect in case the oscillator is set to run free (see above: Free-run). The Phase is particularly interesting for certain types of sounds (mainly Bass), but also when Oscillator 1 is used for FM or AM (FM and AM are explained in the Glossary) of either the Oscillator 2 or the Filter.

Between the two oscillators you find the **Detune** dial, which allows you to adjust both oscillators' frequency in two different directions to create the typical “swirling” or “detuned” sound.

Oscillator 2

The **FM** controller will adjust the amount of frequency modulation of Oscillator 2 through Oscillator 1. This type of modulation is great for producing metallic, bell-like tones and can also be used to produce rich and complex waveforms.

Oscillator Mixer

In the Oscillator Mixer you can adjust the volume of the two oscillators and the noise source.

The dials Osc 1 and Osc 2 can be turned into “red”, which means that their volume can be turned so high that it saturates at the filter input and thus produces new harmonics.

The **Ring** (ring-modulation) parameter below the Osc 2 dial allows a gradual adjustment of how the output of Oscillator 2 is made from Oscillator 2 and its integrated Amplitude- and Ring-Modulator (see glossary for explanation of Amplitude- and Ring-Modulation).
Turned fully left the output of Oscillator 2 is purely Oscillator 2. Turned fully right the output of Oscillator 2 is fully the ring modulation result of Oscillator 1 and Oscillator 2. In middle position the output is mix of Oscillator 2 and the ring modulation result (which is the same as Amplitude Modulation or in short AM).

Filter / Filter Env

The LinPlug MorphoX contains a special, newly designed filter, which produces a unique, characteristic sound you won't find in any other instrument. It supports morphing and offers three simultaneous outputs: low pass, band pass and high pass.

The **FM** parameter determines how much the filters cutoff frequency is modulated by Oscillator 1. Note, that even if Oscillator 1 is turned fully silent in the Oscillator Mixer, it can be used to modulate the filter cutoff frequency.

Cutoff is used to set the frequency at which frequencies are filtered out of the signal. When using the Low Pass output, higher settings produce brighter sounds while lower settings result in darker sounds. When using the High Pass output higher settings produce thinner, brighter sounds, while lower settings produce fatter, darker sounds.
When using the bandpass output, only the frequency spectrum around the cutoff frequency is passing the filter.

Track (tracking) is used to control the degree to which the filter tracks the note being played. So higher notes have a higher cutoff frequency, while

lower notes have a lower cutoff frequency. When the dial is moved to the left the effect of filter tracking is just opposite as described.

The **Depth** dial is used to set the degree to which the filter's envelope effects the Cutoff. Setting Depth to -100% (i.e. turning the dial completely counter-clockwise) means that the envelope has full negative effect on the filter. Adjusting the dial to the middle position means that it has no effect on the filter. Turning the dial completely clockwise means that the filter is modulated by the envelope's full range (100%).
The negative envelope depth can be used for special effects, in example for opening the Filter when a note is released (this is impossible with a non-inverted ADSR envelope).

Reso (resonance) is used to set the amount of emphasis around the cutoff frequency, up to self resonance, thus adding something to the signal. Higher settings create a more pronounced peak in the signal while lower settings produce a flatter response.

Below the Filter you find the **Filter Envelope**, which is a standard ADSR envelope, for more details see the chapter ADSR envelopes right after the Filter Mix section.

Filter Mix

To the right of the filter there on three dials to mix the different outputs of the filter. Each dial controls the volume of low pass, band pass and high pass respectively.

LP (lowpass): This filter type allows frequencies that fall below the cutoff frequency to pass.

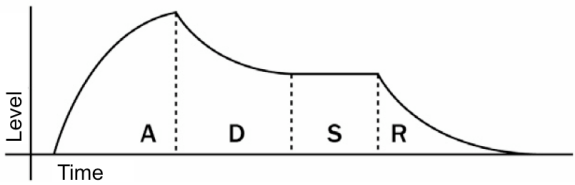
HP (high-pass): This filter type allows frequencies above the cutoff frequency to pass.

BP (bandpass): The frequency band directly surrounding the cutoff frequency is allowed to pass. All other frequencies are cut.

By mixing LP and HP one can also create a band reject filter (BR or Notch filter).

ADSR Envelope

ADSR envelopes can be found in the Filter Env section (controlling filter cutoff, depending on the Depth dial in the Filter section), in the Amp Env section (controlling the overall amplitude of the sound) and in the Mod Env section (a general purpose envelope, routed in the modulation matrix).



The A (Attack Time) Slider is used to set the time it takes for the envelope to reach its full level. For example, if the Attack Slider is set at lowest position (full down), the envelope will move from zero to peak level immediately. If the Attack Slider is set to highest position, the envelope will move from zero to peak level in the maximum time of about 16 seconds.
So by adjusting the slider position one can change the time it takes for the envelope gradually from zero over some milliseconds up on many seconds and finally 16 seconds.

The D (Decay Time) Slider determines the time it takes for the envelope to move from the peak level to the Sustain level (which is set with the next slider). Again, set to the lowest position, the envelope will move from the peak level to the Sustain level immediately and set to top position it will take about 16 seconds.

The S (Sustain Level) Sliders setting determines the envelope level after the initial Attack/Decay phase while a note is being held. If set to the lowest position the envelope will be at zero level when finishing the Decay phase. If set to the maximum position the envelope will remain on peak level (so actually it will not really decay when sustain is at maximum position).

The R (Release Time) Slider is used to set the time that the envelope takes to move from their current level to silence after the note is released. Typically this will happen from Sustain level, however, when the note is being released before Sustain is reached, the release time starts right where the envelope currently is.

Master / Amp Env

The LinPlug MorphoX's Master section is located to the right of the Filter Mix section. This section contains controls for overall- and effects-amplitude.

The Master sections follows right of the filter section. It features Vol (volume) control to adjust the overall output volume.

The Vel (velocity) control allows adjustment of the influence that the note's velocity has on volume. When turned fully to the left the velocity has no influence on the volume while turned fully right means that the volume is mainly depending on velocity.

The Chorus and Delay sliders control the amount of chorus and delay which is added to the synth output signal. It's the same as the Wet control you often find on effects plugins.

Right below the Master section is the Amp Env section which consists of a standard ADSR envelope to control the overall volume. Refer to chapter ADSR Envelope right prior this chapter for more details about ADSR envelopes.

Effects

The LinPlug MorphoX has two fully morphing stereo effects units: Chorus and Delay.

Chorus

The Chorus effect can be used to "thicken" a single sound creating the impression that it contains multiple voices. The Chorus works by mixing delayed signals with the original signal.

The Chorus slider in the Master section left of the Chorus allows you to set the amount of chorus mixed to the signal.

The Time dial is used for setting the delay time. Longer times produce a "chorusing" effect while shorter times create a "flanging" effect.

The Rate dial sets the rate at which the delay time is modulated.

The Feedback dial allows you to send back the signal from the output of the Chorus to its input. This is usually used when creating flanging sounds with shorter delay times.

Delay

The Delay functions as follows: the input signal is first delayed by Pre Time, then it’s delayed by Left Time and finally by the Right Time. If Feedback is applied the “Right” signal is fed back into the left delay line, so that an alternating left-right delay is produced. The delayed signal usually appears on the left first.

The Pre, Left and Right menus are used for setting the pre-delay, left and right channel delay times (in note length, the delay is always tempo-synced).

The Stereo dial is used to set the pan position of the left and right delays. When set fully right, the Left delay signal appears left and the Right delay signal appears right, moving the dial gradually reduces stereo width. In the middle position the output of the delay is centered. Turning the dial fully left inverts the stereo positions, so the delayed signal appears on the right first.

The Feedback dial allows you to set the number of times the signal repeats or echoes.

The small LP and HP dials gradually apply a low-pass or high-pass filter on the delayed signal, so the signal changes its harmonics with every repetition. This is both good for natural delays as well as some special effects.

The Stereo/Mono switch in the Delay's title is usually set to Stereo, however, for certain sounds (especially those with a stereo signal, in example when the Oscillators are panned) it can sound better to mix down the input of the delay to mono. Thus the delay can be switched to mono. Note: It's still a Stereo delay with Stereo output, just its input is changed.

Modulation

One of the key features of the MorphoX are its sophisticated modulation capabilities. The instrument contains four independent LFOs (low frequency oscillators, two of them described in this chapter, the other two located in the Global Area and described there) as well as a Modulation Matrix that is used to control modulation routing, the Modulation Envelope, Glide and Precision (an analogue instability simulation).

LFO 1 and LFO 2

An LFO is an oscillator that generates low frequency signals that are used to modulate other aspects of the signal.

To select one of the LFOs waveforms click on one of the waveform buttons at the left of the respective LFO section. Seven LFO waveforms are available and printed right onto the waveform buttons. It should be noted that when the Noise and Sample and Hold waveforms are synced to tempo, they run at a faster tempo than the other LFO waveforms. The Sample and Hold and Noise waveforms will change their state exactly 12 times faster.

The Freq (Frequency) parameter determines the LFO's frequency (within a range from 0.01 to 32 Hz). This parameter has no function if Sync is used. Right above the Freq dial is the Sync menu to sync LFO tempo with the current host/song tempo. Note that the LFO is restarted with each Note's start.

You can also apply a simple envelope to the LFO using the Delay, Attack dials.

The Del (delay) parameter sets the time before the LFO begins running. When set to the leftmost setting it starts immediately.

The Att (attack) dial next to it determines the time it takes for the LFO to reach its full level (and thus the full modulation depth). This can be used to slowly increase the amount of modulation applied. When turned fully left, it means that modulation commences immediately.

Modulation Matrix

The MorphoX's Modulation Matrix allows you to create user-defined modulation routings. Many parameters are available as modulation destinations, which can be modulated by various modulation sources (see

Appendix A for a complete listing and description of all modulation sources and destinations).
Modulation sources are shown in a column on the left of the display, while the destinations are shown on the right. The modulation amount is displayed in the middle. To change a routing click on the source or destination that you want to change. A menu will appear which lets you select the new source or destination. To remove a modulation source or destination select the "- - - - -" entry in the menu.

To change the modulation depth click on the amount display and move the mouse (while keeping the mouse button pressed) upwards or downwards (increasing or decreasing the value) until the desired amount has been reached. The further you move the mouse, the less sensitive it gets, allowing more drastic changes.

A negative modulation depth inverts the waveform of the modulation source. Double-clicking on a modulation depth display sets the value to 0.00 (disabled). Double-clicking again on the display restores the previous value. This can be useful when creating new Presets to quickly disable modulation routings.

The modulation of pitch has a special display for modulation depth. In example a modulation depth of "2:50" means that the respective pitch is modulated to a depth of 2 semitones and 50 cents.

Modulation Envelope

The Modulation Envelope is a general purpose envelope, used as Modulation Source in the Modulation Matrix. See chapter Modulation Matrix right before this chapter for more info on the matrix and chapter ADSR Envelopes for more info about ADSR envelopes.

Glide

Glide continuously changes the pitch from one note to the next, connecting the notes and letting you smoothly "glide" from one to the other (sometimes called portamento).

Glide has 3 modes: Off, Held and On. The On and Off functions turn "Glide" on and off. The "Held" setting is similar to On, but works as follows: If notes overlap then Glide is applied, however if they don't overlap then the notes are played without Glide. This makes it possible to apply Glide only to selected notes..

The Time dial controls the time it takes to move from one note to the next. It will take the same amount of time to reach the destination pitch regardless of whether the preceding notes are a semitone apart or an octave apart.

Precision

The "Precision" control below the Glide section can be used to set the accuracy of the LinPlug MorphoX's signal generation. When the "Precision" control is set to less than 100% small inaccuracies are introduced at various points in the LinPlug MorphoX's signal chain. This is useful if you're trying to replicate the warmth of an old analog synthesizer. Precision can be set in a range from 90% to 100%.

Global Area

In the global area there are the not-morphing parts, like the arpeggiator, two global LFO's, the morph-settings and the preset handling controls.

The Arpeggiator

The MorphoX's Arpeggiator is the dominating module in the left of the global area. It allows you to create a vast variety of user-defined arpeggios. Arpeggios are chords that are played as separate successive notes or "broken chords". With the MorphoX's Arpeggiator you can control the way the Arpeggio is played in many, unusual ways including some wicked modulations.

Clicking on the title "Arpeggiator" offers you a menu of functions that includes saving and loading arpeggios; initialisation and copy and paste, so you can easily transfer arpeggios to other presets or your own creations. You can build an entire library of your own creative arpeggios.

The parameters of the MorphoX Arpeggiator are:
Arpeggiator / Step Display

The large display with the 16 step values is the heart of the Arpeggiator. Here is where the rhythmic variations of the Arpeggiator can be defined.

As we said before an arpeggio is a Chord broken into Notes of equal length (defined by using the Clock parameter). In the Steps you can give these equal Notes different velocity values, make pauses instead of notes or tie notes together to create notes with a different note length.

Each step can be set to it's own velocity value of 1..127, and also to the value Off, which means that there is actually a pause, or to Tie which means that the steps are bound together creating a longer note.

If you play a C-E-G chord in example, the step values of 127, 127, Off, 100, Tie, 30, Off, Tie would result in the following (assuming a 1/16 clock, and mode Up)

- Note C being played with maximum velocity, length 1/16th
- Note E played just the same 1/16th length and 127 velocity
- then a 1/16th pause
- Note G played with velocity 100 (an average volume) and a note length of 1/8th (as the next step is tied to this step)
- then Note C again, played with a very gentle velocity of 30 at 1/16th length
- finally a 1/8th pause

After reaching the end the arpeggio just starts over from the beginning. Note that the arpeggio will variate the pattern such that when starting with step one again it now plays a E with velocity 127 and 1/16th length first; that's because we played a 3 note chord and have a 4 note step definition (playing C-E-G-C, next round E-G-C-E and then G-C-E-G before starting with the first pattern again).

Also note that a Tie after an Off is just the same as placing an Off behind another Off, both resulting in a longer pause.

Arpeggiator / Mode

Below the step display, on the very left, the Mode defines how the Arpeggiator functions with several options available:

Chord: does not play the Chord as separate Notes but as a Chord in rhythmic phrases defined by the other parameters.

Modulation: Basically the Arpeggiator is Off and does not influence Chords (or single notes) being played. But the Arpeggiator is available as a Modulation Source in the Modulation Matrix as if it were switched On. Using the Arpeggiator in the Modulation Matrix is like having an LFO with up to 16 individually definable steps.

Up, Down, UpDown, DownUp, UpDown+ and DownUp+ modes play typical arpeggiator patterns or arpeggios, which as we said before are the notes of the chord being played successively instead of simultaneously.

In Up mode the notes are played from lowest Note on upward. In Down its the other way around. UpDown and DownUp alternatively play the notes from lowest to highest and from highest to lowest. With UpDown it's as the name suggests, first, notes are played from the lowest note upward. With DownUp it's just the opposite.

A + sign behind the mode indicates that the highest and lowest notes are being played twice. For example, a C-E-G chord would be played in UpDown-Mode C-E-G-E and again from the beginning, while in UpDown+ mode it will be played C-E-G-G-E-C and from the beginning on again.

AsPlayed Mode plays the notes in the order the Note On signal arrives or simply, the way you actually played the chord. This effect is easiest to understand when you play notes of a chord not exactly at the same time. The order they are actually played is exactly as you played them.

Random Mode plays the notes of the chord in a random order

Arpeggiator / Clock
Next to the Mode is the Clock setting, which allows you to set the length of the individual notes in which the chord is separated by the Arpeggiator. For example, when set to 1/16 it will play all the notes as 1/16th notes.

Arpeggiator / Retrigger
The small Retrig (Retrigger) switch to the right of the clock parameter defines whether a new chord will restart the Arpeggiator or not. If you have a pause between two chords being played, the Arpeggiator will restart with the first step when the Retrigger is activated. If it's deactivated it will continue on the next step when a new chord is played.

Arpeggiator / Octave
This extends the note range being played regardless of the octave in which you played them originally. For example, you can choose notes of the chord and not only they will be played in the octave at which the chord is played, but also in the octave above. This can be extended up to 4 octaves, again we recommend you just try it to hear the obvious effect.

Arpeggiator / Steps
Steps allows you to define how many of the up to 16 steps are actually used for a particular arpeggio. It could be a very short two step arpeggio or anything up to 16 steps.

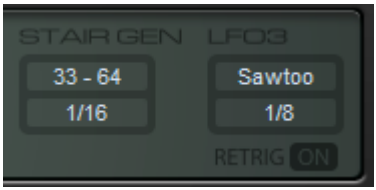
Arpeggiator / Gate
The Gate is the only morphing parameter in the Global Area, simply because its technically possible and musically useful. The fact that its morphable is indicated by the special label below it, which will also change when changing from sub program A to B or vice versa.

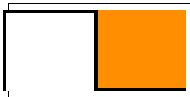
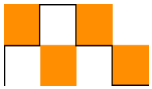
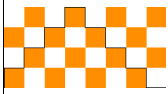
Gate defines the length of the actual Note On time of a note (followed by a certain Note Off time). As we said, clock defines the length of the steps, such as a 1/16th note. With the Gate parameter you can define how much of this time the note is actually On and how much it is Off. With a setting of full right the note length is the same as the step length. A middle setting allows the Note to be on just half of the time (for example a 1/32th of the 1/16th step). The more you turn the dial to the left the shorter the note is played. The effect is most prominent with sounds that have a short release time.

Stair Generator

The Stair Generator is basically a globally running LFO. It has only two controls, the lower one is setting the speed at which it proceeds from one step of the stair waveform to the next.

The upper parameter defines how many levels the stair is made of, and thus how long it takes for a complete cycle. As you can see from the below examples, there is a fixed correlation between the amount of levels and the length of a complete cycle:

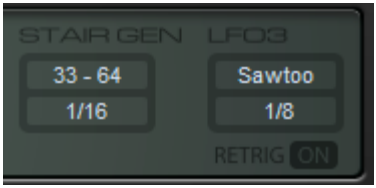


	This is the simplest stair, made of 2 levels which makes a 2 step cycle. In MorphoX it is named 2-2.
	This stair has 3 levels, the floor, one in the middle and the highest. It takes 4 steps to complete one cycle. Its named 3-4
	This is the 4-6 as it consists of 4 levels and takes 6 steps.
	The last example is the 5-8, you guess it: it has 5 levels and takes 8 steps, so at a speed of 1/16th it takes 8*1/16th = half a note to complete.

The possible amount of levels goes way further up and finally produces a more and more almost triangular-looking waveform; at the maximum setting the waveform is hard to be perceived as steps anymore, depending on the kind of modulation the Stair Gen is used for.

LFO 3

The LFO 3 is a host synced LFO. It both synchronises with tempo as well as song position, so the start of a bar in the song will also be the start of a cycle of this LFO. This only works for speeds equal or faster than 1/1, if you for example choose 4/1, of course the LFO can only starts its cycle every 4th bar.



The first parameter selects the Waveform, while the second selects the Speed (in note's length).

When choosing Retrigger, the LFO is only tempos-synced to the host/song (but not position-synced), it will start its cycle with each first note after a pause.

Morph Settings

The Morph Settings are best explained from right to left. On the very right you find the modulation wheel, which serves both as a control you can click and move with your mouse,as well as a status display of your (real world keyboard's) modulation wheel. Moving this control or either your keyboard's modulation wheel will morph the sound of MorphoX between the two sub programs A and B.

You can switch the display between the two sub programs A and B by using the A and B buttons left of the modulation wheel.

Between the A and B buttons you'll find the Link button which serves as a connection between the modulation wheel and the A and B buttons: whenever you move the wheel above its center, button B will become active and whenever you move it below its center, button A will become active. This also works the other way around, switching either the A or B button will make the wheel move fully up or fully down. for
Using this Link button makes sure you always see and edit the sound which corresponds best to the current sound you hear when playing.

Left of the three buttons are the two dials labeled max and min. Sometimes you may find that the best sound for a particular purpose is not at the outermost positions of the wheel. For this purpose you can limit the range of morphing by using these two dials to a certain range.

On the very left of the morph section you find the morph curve. Usually the morphing happens in a linear fashion, indicated by a straight line. By moving this control downwards the morphing slowly moves from A to the middle and quickly approaches B at the end. When moving this control upwards however, the morphing quickly moves from A towards the middle and slowly approaches B at the end.

Preset Browser / File Controls

The Preset Browser consists of two displays. The left one shows the Current Bank and the right one shows the Current Preset. Whenever a Preset is loaded using the file controls right of these displays, the Preset name is updated with the name of the loaded Preset and the Bank name (that's the name of the directory that contains the Preset).

By default the Preset Browser points to the factory presets installed with the LinPlug MorphoX.
Presets can be changed in three different ways. You can load a new Preset with the file controls, which work by clicking the < (Previous) or > (Next) arrow buttons located right of the Preset name.
You can select the desired Preset directly from the right display, which turns into a menu when you click on it.
You can also change a Preset by sending a program change command from your host to the synth (could be either a built in feature of the host or a MIDI program change from your MIDI controller).

The Current Location can be changed by loading a Preset from a different directory or by selecting the desired location from the left display, which also turns into a menu when you click on it.

The File Controls located to the right of the arrow buttons are used for all File-related operations. The Load button opens a dialog that lets you select a file for loading. The Save button allows you to save the current Preset settings.

Note that when you load a Preset using the Master section's file controls, the previous Preset is erased so if you want to keep changes in a Preset, make sure you save it before loading another one.

Voices

The Voices control is used to set the polyphony available. The maximum polyphony is 32 voices. A variety of settings are available for polyphony: "mono", "2" to "12" and "oo".

Mono means, that, say that you hold down one key and then press and release a second key. In the case of the "mono" voice setting, the first note will sound, and then the second note sounds. When the second note is released *the first note sounds again*. This is typical for MONO mode and creates a "pedal tone" effect.
The oo setting allows maximum polyphony, which is 32 voices.

ECS (MIDI Learn)

The ECS (Easy Controller Setup) section makes it simple to control the LinPlug MorphoX from an external MIDI controller (either hardware or software). All you have to select Learn from the ECS menu, select a LinPlug MorphoX parameter with the mouse and finally send some MIDI messages from you MIDI source. That's all there is to do!
From now on you can change the parameter with that controller. You can define up to 128 parameter-controller-combinations. This does not depend on the type of controller you have nor the particular MIDI Control Change messages it sends.

ECS settings are save automatically, but can be saved and restored manually using the Load and Save functions from the menu. A single controller assignment can be cleared using the Clear menu entry and move controls that you wish to be cleared (de-assigned from MIDI CC's).

The Clear All function clears all controller assignments at once.

Don't forget to switch Off the ECS after you have finished making or clearing assignments!

A special feature in MorphoX is the ability of ECS to control both the parameters of the A and B sound, this is described in detail as “ECS to A and B” in the next chapter Settings.

Settings

The Settings on the "Rear Panel" of the LinPlug MorphoX are accessed by clicking on the LinPlug MorphoX logo at the bottom left of the LinPlug MorphoX's front panel or the Setup button at the bottom right of the front panel. Several controls have been located here to make the front panel less crowded, and also so that they are not changed accidentally while the LinPlug MorphoX is in use.

Dial Mode is used to select the LinPlug MorphoX's dial operation mode. Two modes are available: Circular and Linear. In Circular mode the MorphoX's dials track cursor movement in a circular fashion around the dial. In Linear mode the MorphoX's dials track vertical cursor movement. It's important to note that some sequencers can override the instrument's dial mode settings so if the MorphoX's dials are not operating in the correct manner, check the host program's settings.

Master Tune is used to set the overall tuning of the LinPlug MorphoX if no micro-tuning file is loaded . Tuning can be set from 415.3 Hz to 466.2 Hz.

ECS to A and B when this option is checked, the MorphoX's MIDI Learn will not only allow to control a certain parameter, but will also support

changes to both part A and part B, depending on which page you are currently editing the sound.
When using MIDI controllers to perform live or to automate parameters its recommended to have this switched Off. When using MIDI controllers to edit a patch you might find it useful to have this switched On.

The **Bend Up** Range control is used to set the LinPlug MorphoX's response to pitch bend messages. Bend Range can be set from 0 to 24 semitones. A setting of 0 means that the Pitch Wheel won't affect the sounds pitch.

The **Bend Down** Range control is used to set the LinPlug MorphoX's response to pitch bend messages. Bend Down Range can be set from 0 to 24 semitones.
The Bend Down Range control can also be set to “Link” in which case the Bend Down Range is the same as the Bend Up Range.

Scale: See Appendix B for a complete description of how to use TUN files in the LinPlug MorphoX.

Startup is used to define a preset that is loaded upon startup of MorphoX (when you insert a new instance of MorphoX in your host).

Below this you find the actual version of MorphoX you are running and in the S/N field whether it runs as a “Demo” (showing “Enter Serial here”) or full product (showing “Valid”)

To switch back to the Front Panel click the LinPlug MorphoX logo on the Rear Panel or the Edit button bottom right.

Glossary

AM: AM or "Amplitude Modulation" is a process where the amplitude of one oscillator (the carrier) is controlled by another (the modulator). When the frequency of the modulator is periodic and below the audio range (less than 20 Hz) tremolo is produced. When the modulation frequency is within the audio range metallic overtones are produced.

Amplifier: A signal processing device that changes the amplitude, and hence the volume, of a signal.

Effect: A signal processing device that changes some aspect of the input signal. An enormous number of different effect types are available. These include Chorus (which produces a thickening of the signal), Delay (adding echoes to the signal) and Distortion (which changes the shape of the waveform usually adding overtones).

Envelope: A time-varying signal used to control the development of another signal after it has been triggered. Envelopes are often used for controlling a signal's amplitude or filter's frequency. The shape of the envelope is determined by the number of control parameters. Usually four parameters are available: Attack Time, Decay Time, Sustain Level and Release Time.

Filter: A signal processing device that suppresses or "filters" out specific parts of a signal's frequency spectrum. Numerous types of filter are used in audio synthesis. These include Low Pass, High Pass, Band Pass and Notch.

FM: FM or "Frequency Modulation" is a process where the frequency of one oscillator or filter (the carrier) is controlled by another (the modulator). When the frequency of the modulator is periodic and below the audio range (less than 20 Hz) vibrato is produced. When the modulation frequency is within the audio range, Frequency Modulation is produced.

LFO: An LFO or "Low Frequency Oscillator" is a periodic signal source (usually below audio frequency range) used to modulate another module's parameter. An LFO can be used for a variety of effects including vibrato (by modulating the pitch) and tremolo (by modulating the volume).

Modulation Matrix: A signal "junction" where a source signal can be patched so that it controls a destination signal. The MorphoX's Modulation Matrix is used for tasks such as modulating an oscillator's amplitude by an LFO.

Oscillator: A signal source that generates a periodic waveform at a given frequency.

Ring Modulation: The process of combining two audio signals by multiplication. Ring Modulation produces sidebands but suppresses both the carrier and modulating frequencies.

Noise: Specifically White Noise is a signal which contains equal energy over its frequency range, compared to other types of noise, white noise has a "bright" sound.

MIDI Implementation Chart

Product: MorphoX Version 1.x Date: 10.September 2010
Manufacturer LinPlug Virtual Instruments GmbH

Function	Transmitted	Recognized	Remarks
Basic Channel			
Default	no	no	
Changed	no	no	
Mode			
Default	no	Omni	
Changed	no	no	
Note Number			
	no	**yes**	
True Voice	no	no	
Velocity			
Note On	no	**yes**	
Note Off	no	no	
Aftertouch			
Poly (Key)	no	**yes**	
Mono (Channel)	no	**yes**	
Pitch Bend	no	**yes**	
Control Change	no	**yes**	
Program Change	no	**yes**	
System Exclusive	no	no	
System Common			
Song Position	no	no	
Song Select	no	no	
Tune Request	no	no	
System Realtime			
Clock	no	no	
Commands	no	no	
Aux Messages			
Local On/Off	no	no	
All Notes Off	no	**yes**	
Active Sensing	no	no	
System Reset	no	**yes**	

Appendix A: Modulation Sources and Destinations

Modulation Sources

Keyfollow	The note being played with a linear response. The modulation value follows the note number (bipolar).
Velocity	The MIDI note-on velocity information. The harder the key is hit, the higher the modulation value (unipolar).
Aftertouch	The Aftertouch, also sometimes called Pressure value (either Mono or Poly, whatever your keyboard supports) is used as modulation source. Your MIDI keyboard must support this. If this doesn't work it is likely that your keyboard has no aftertouch (unipolar).
Pitch Wheel	The value of the Pitch-Wheel is taken as modulation source, maybe it makes sense to reduce the Pitch Wheel range on the Settings page to 0 when using the Pitch Wheel as modulation source. The Pitch Wheel is bipolar
Modulation Wheel	The MIDI modulation wheel (MIDI CC 1) (unipolar). This one is mainly used to control the morphing. Thought it might make sense to use it in the modulation matrix.
Breath Controller	MIDI CC 2 (unipolar).
Foot Controller	MIDI CC 4 (unipolar).
Expression Contr.	MIDI CC 11 (unipolar).
Amp Envelope	The Main Amplitude envelope. This envelope controls the overall output Volume, however if it makes sense within the preset to do so, the envelope can be used as a modulation source (unipolar).

Filter Envelope	The envelope of the Filter. This envelopes control the Filter cutoff frequency, however if it makes sense within the preset to do so, the envelope can be used as a modulation source (unipolar).
Mod Envelope	The Mod-Envelope is dedicated to be used in the matrix and can be routed to any available modulation destination (unipolar).
Glide Envelope	The envelope of the Glide effect (when used). This envelopes control the gradual frequency change of the played note when Glide is activated. However if it makes sense within the preset to do so, this envelope can be used as a modulation source (unipolar).
LFO 1	LFO 1 (bipolar).
LFO 2	LFO 2 (bipolar).
LFO 3	LFO 3 (bipolar).
Arpeggiator	As a special modulation source the Arpeggiator is useable as modulation source too. Usually it then runs in Mod-Only mode, but every mode other than Off will work. (unipolar)
Stair Generator	The Stair Generator is a special, globally running LFO. It is quite similar to LFO 3, however it has a different, stair alike waveform.
Random Unipolar	A random unipolar source. The value of this source is the same if used in several modulation routing. If you for example route it to filter and amplitude both will be modulated with the same random amount . The amount of course changes randomly on each note being played. Unipolar means that the source is only increasing (or if applied with negative depth, decreasing) the targets value.

Random Bipolar	Similar to Random Unipolar, however a random bipolar source. Bipolar means that the source is randomly increasing or decreasing the target's value.
Alternate	The Alternate modulation source changes between values of 1 and -1 for each note. This is useful for modulation effects such as auto-panning (bipolar).
Const	The Modulation Amount is used as a constant modulation value (unipolar).

Modulation Destinations

Osc 1 or 2 Amplitude	The amplitude (volume) of the respective Oscillator. In order to create the classic tremolo effect it is better to use Main Amplitude as the modulation destination as this is applied to the whole voice.
Osc 1 or 2 Pitch	The pitch of the respective Oscillator. In order to create the classic vibrato effect it is better to use Main Pitch as the modulation destination as this is applied to the whole voice.
Osc 1 or 2 Symmetry	Pulsewidth or Symmetry of the respective Oscillator waveform, used to thicken a sound or make it swirl, effect depends on intensity and modulation speed, typically with LFO.
Osc 1 or 2 Panning	Pan position of the oscillator output, used for stereo effects, for example, with an LFO as the source for a permanently moving sound, or with Envelopes to let the oscillator output move through the stereo panorama.
Osc 1 Start Phase	Modulates the start point in the waveform of oscillator 1, if its not set to Free-Run.
Osc 1 or 2 Spread Pitch	If Spread is used in the respective oscillator, one can hereby control the amount of detuning within the range null (no detune) up to the value as set by the Spread slider.

Osc 1 or 2 Spread Volume	If Spread is used in the respective oscillator, one can hereby control the volume of the additional voices within the range null (no additional sound) up to the full volume.
Osc 2 Ringmod	Controls the output of oscillator 2 in the same way as the Ringmod parameter below osc 2 in the mixer, thus allows to dynamically change the mix of oscillator 2 and the ring modulators output.
Osc 2 FM Amount	Controls the amount of frequency modulation of oscillator two by oscillator one.
Filter Cutoff	Cutoff frequency of the Filter, often used with an LFO to create filter sweeps or with Velocity to simulate an acoustic instrument's response to note attack.
Filter Cutoff FM	The intensity of the FM modulation of the filters cutoff frequency.
Filter Resonance	Resonance of the Filter, sometimes a rather subtle effect, sometimes drastic.
Filter Env-Depth	Controls with how much the filter envelope affects the filter cutoff frequency.
Filter LP Volume	The volume of the low pass output of the filter.
Filter BP Volume	The volume of the band pass output of the filter.
Filter HP Volume	The volume of the high pass output of the filter.
Main Amplitude	Used to control the overall volume of the patch.
Main Pitch	Used to control the overall pitch of this patch.
Main Noise Volume	Allows modulation of the noise amount in the oscillator mixer.
Main Osc Stereo	When oscillator one or oscillator two runs in Spread mode, the different voices are usually centered.

	However when increasing the value of this modulation target, the voices are gradually spread in stereo panorama.
Matrix Depth 1,2,3,4	Intensity of the first four entries (line 1 to 4) in the Modulation Matrix, often used with the ModWheel as source to control a specific modulation parameter (e.g. Vibrato).
LFO Speed 1,2,3	Speed of LFO 1 to 3, this allows tempo changes of the LFO to be programmed. Typically this is used with Mod-Env as the source. Another example is Key Lin which can be used to make the LFO run faster with higher notes.
Envelope Xxx Att	The Attack Time of the respective Envelope (either Amp=Amplitude, Fil=Filter or Mod=Modulation).
Envelope Xxx Dec	The Decay Time of the respective Envelope.
Envelope Xxx Rel	The Release Time of the respective Envelope.

Note that the envelope modulation targets will not allow continuous modulation. This modulation is always applied once when the note starts.

Appendix B: Using TUN Files

By Jacky Ligon

About Microtuning

Microtuning, or "microtonality" are methods for tuning musical instruments whereby musicians may explore and compose with ethnic, historical and contemporary tuning-systems. Microtuning musical instruments allows one to use scales which may have pitches lying between the notes of our familiar Western 12 tone scale. These pitches which are found in the 'cracks' of 12 Tone Equal Temperament are one of the things that give music's of Bali, India, Africa, Thailand, Turkey and the Middle East (to name but a few) a special intonational flavor, but is something that is of immeasurable value to the contemporary acoustic and electronic composer, who may require a more broad palette of musical pitches for their music.

The quest for creating beautiful and musically useful tuning-systems has been an unending process of discovery and debate amongst musical theorists, mathematicians, physicists and musicians going back to early history. Quite often the reasons for micro-tuning instruments may involve improving the consonant intervals of a tuning-system for sweeter sounding harmonies, as well as offering wider variety of choices for melody. "Microtuning" an instrument can sometimes mean there may be less or more than 12 tones in an octave, or even that the octave itself may be stretched or compressed. Microtuning is a vast topic, rich with lore, music and an infinity of musical possibilities for the sonic explorer.

Creating TUN microtuning files with SCALA

Scala is a freeware utility developed by Manuel Op de Coul in the Netherlands, which can be used for the creation and analysis of historical, ethnic and contemporary microtunings. A powerful capability of Scala is that it enables the user to create the proprietary tuning data required for microtuning a wide range of hardware and software synthesizers and samplers.

Scala may be used to create the TUN format microtuning-files needed to explore microtunings with this instrument.

The Scala home page is http://www.xs4all.nl/~huygensf/scala/

Specifying the Reference Frequency of a Microtuning

One of the powerful capabilities of the TUN file format and Scala, is the ability to specify the pitch and midi note which will be the reference pitch for the microtuning in use. This becomes a very important consideration when one is using a number of different synthesizers and wishes to keep them in tune with a given base frequency. It is very common for one to specify a chosen concert pitch such as A440 Hz or C261.6256 Hz as a reference for a microtuning, however, the flexibility of the TUN format and Scala enables one to specify this frequency arbitrarily. In Scala this reference is called Map Frequency.

As well as being able to specify the Map Frequency, one can also specify a central midi-note, which will become the starting point for the microtuning in use. Being able to specify a particular midi-note on the controller, provides a way to map a microtuning beginning on any desired midi key, making it easier to navigate the keyboard when there may be more or less than 12 tones per octave, or where one may desire to have the notes of a tuning fall on certain physical keys.

Important Note

When one uses a TUN microtuning-file in the MorphoX, the above specified mapping properties will override the Master Tuning reference. Normally when one is using the default 12 Tone Equal Tempered Scale, the Master Tuning will be used to make fine pitch adjustments around the standard concert pitch of A440 Hz, but when one has specified another pitch base for a microtuning when the TUN file is created in Scala, such as C261.6256 Hz, the data in the TUN microtuning-file will provide a new pitch reference.